

Snyder v. Bass Pro Outdoor World, LLC. Engineering Investigation

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Project No.: S15-016

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Introduction

On or about March 27, 2015, Beacon Scientific was asked to conduct an engineering investigation involving a fall incident which occurred while a hunter was using a climbing treestand to hunt at an elevated position (above the ground). The seat platform separated from the tree and allowed the hunter to fall to the ground and sustain permanent injuries requiring medical attention.

Beacon Scientific was asked to review the information which was provided, to inspect and evaluate the accident site/tree, to inspect and evaluate the physical evidence/treestand, to conduct exemplar testing, and to determine what factors caused and/or contributed to the incident.

Background

November 16, 2013, Mr. David Snyder was using an API brand climbing treestand to hunt deer in the Davy Crockett National Forest approximately 6 miles northeast of Groveton, Texas. Mr. Snyder claimed he had climbed the tree such that his feet were at approximately 19 feet above ground level. Mr. Snyder claimed he had been hunting from this elevation for approximately an hour when the seat platform of his climbing treestand (upper portion of the treestand) separated completely from the tree causing Mr. Snyder to fall to the ground below sustaining permanent injury. At the time of the incident Mr. Snyder was not utilizing the full body harness system which was co-packaged with the product when originally purchased. Further, Mr. Snyder was not utilizing any of the various stabilizing and connection components which were intended to be used with the treestand system.

The treestand being utilized by Mr. Snyder at the time of his incident carried the API brand name, and appears to be the Grand Slam Extreme model that

manufactured in 2003 by Outland Sports, Inc. Bass Pro Shop Outdoor World, LLC (Bass Pro) was reportedly the retailer of the product, but no proof of purchase has been produced or identified. In 2003, Outland Sports distributed API brand products to various retailers, including but not limited to Bass Pro. Although Plaintiff has claimed that he purchased the product in 2007, 2008 or 2009 from the Bass Pro store in Katy, Texas, Bass Pro Outdoor World, LLC, has confirmed that it did not sell any Outland Sports, Inc. products in or after 2006.

The treestand was constructed from extruded aluminum tubing components which were welded to form the structural assembly. The seat frame and foot platform were mechanically connected to the tree by a pinned roller chain assembly. The roller chain assembly connected to either side of the treestand and extended around the back side of the tree. When loaded by the user, the roller chain assembly opposed the contact forces of 'bark biters' on the treestand (a yoke with a serrated edge) to grip the tree. The opposing forces of the chain assembly and 'bark biters' were proportional to the user's weight and position on the treestand platforms.

The product was sold as a complete climbing system including an interconnected foot and seat platform which could be independently moved up or down the tree, a full body harness system, a tree strap/belt to connect the harness to the tree, and written and video warnings and instructions. The user climbs and descends the tree by alternately placing one platform against the tree while supporting their weight with the opposite platform in an 'inch worm' like motion. The treestand also included features to further secure the product to the tree when stationary (i.e. not climbing). The product was accompanied by written, and video warnings and instructions at the time of manufacture. Mr. Snyder acknowledged receiving the written and video instructions and the full body harness system at the time of purchase.

Beacon Scientific's Investigation

Beacon Scientific was provided with or gathered the file material which was reviewed, as detailed below. On May 12, 2015, Beacon Scientific conducted a visual/non-destructive inspection of a portion of the physical evidence retained in this matter, as discussed further below. On January 24, 2017, Beacon Scientific conducted a visual/non-destructive inspection of the balance of the physical evidence and an inspection of the site and tree involved in the subject incident, including climbing and documenting physical evidence on the tree.

The opinions expressed in this report were reached based on a reasonable degree of scientific and engineering certainty. These opinions are based on the investigation outlined in this report and the author's education, experience, and background.

Written Materials Reviewed:**Deposition transcripts of:**

- a) Mr. Darren Hogan, dated May 27, 2015
- b) Mr. David L. Snyder, dated March 1, 2017, with Exhibits 1 through 3 and 6 through 9
- c) Mr. Grover (Tiger) Worsham, dated June 1, 2017 (rough transcript)
- d) Mrs. Shannon Worsham, dated June 1, 2017 (rough transcript)
- e) Mr. Jeremy Townsend, dated June 1, 2017 (rough transcript)
- f) Mr. Randy Watts, dated June 1, 2017 (rough transcript)
- g) Mr. Sam Blair, dated June 1, 2017 (rough transcript)
- h) Mr. Samuel Shanafelt, dated June 1, 2017 (rough transcript)
- i) Mr. Richard Willey, dated June 2, 2017 (rough transcript)
- j) Mrs. Danette Willey, dated June 2, 2017 (rough transcript)
- k) Mrs. Lina Snyder, dated June 2, 2017 (rough transcript)
- l) Mr. Louis Snyder, dated June 2, 2017 (rough transcript)

Expert Reports:

- a) C. Kendall Clarke, Ph.D., P.E., Metallurgical Consulting, dated April 21, 2017
- b) Stephen Pustilnik, M.D., South Coast Forensics, LLC, dated April 18, 2017
- c) Juan Latorre, M.D. and Leigh Anne Levy, R.N., CLCP, MediSys Rehabilitation, Inc., dated April 18, 2017

- d) Anthony M. Gamboa, Jr., Ph.D., MBA, Vocational Economics, Inc., dated January 26, 2017
- e) Anthony M. Gamboa, Jr., Ph.D., MBA, Vocational Economics, Inc., dated April 25, 2017

Other Written Materials:

- a) Defendant Third-Party Plaintiff David Snyder's First Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A), along with numerous photographs.
- b) Defendant Third-Party Plaintiff David Snyder's Second Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A)
- c) Defendant Third-Party Plaintiff David Snyder's Third Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A), along with three video clips.
- d) Defendant Third-Party Plaintiff David Snyder's Fourth Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A), along with file material for Gamboa and Pustilnik, family photographs, and a 'chain link graphic'.
- e) Defendant Third-Party Plaintiff David Snyder's Fifth Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A)
- f) Defendant Third-Party Plaintiff David Snyder's Sixth Supplemental Responses to Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(A), along with chain animation, Latorre file materials, and documents marked SNYDER P004893 to 5232.
- g) Documents marked SNYDER P000001 to 7, 12 to 23, 27 to 34, 149 to 155, 4224 to 4234, 4235 (audio recording), and 4236,
- h) Defendant/Third-Party Plaintiff David Snyder's Initial Disclosures Pursuant to Federal Rule of Civil Procedure 26(a)(1)(a)
- i) Defendant Bass Pro Outdoor World, L.L.C.'s Answers to Plaintiff's First Set of Interrogatories
- j) Bass Pro Outdoor World, L.L.C. Response to Plaintiff's First Requests for Production
- k) Defendant Bass Pro Outdoor World, L.L.C.'s Responses to Plaintiff's Requests for Admission
- l) Defense document production marked BPR 000001 to 1278
- m) MACTEC Treestand Tested as of December 6, 2002
- n) MACTEC Treestand Tested as of December 18, 2003
- o) Listing of 'Certified Products for API as of August 17, 2004'
- p) CPSC Recall, API Outdoors, a division of Outland Sports, Release Number 03-027, dated October 20, 2002
- q) Written Product Instruction, API Outdoors, A Division of Outland Sports, Inc., The Grand Slam "MAG SUPREME", Model GS2500MS

- r) Written Product Instruction, API Outdoors, A Division of Outland Sports, Inc., Models GS2750, GS3500MS, GS2500E, GS3400SE, GS2400EB, GSC300, GS3100PE, and GS2600MEG
- s) 30 Color Digital Photographs, filenames 001.jpg to 030.jpg, taken by H T. Heuermann
- t) 5 Color Digital Photographs, filenames 20131129_152732.jpg, 20131129_152752.jpg, 20131129_152759.jpg, 20131129_152825.jpg, and 20131129_152832.jpg
- u) 13 Color Digital Photographs, file names tn_(2).jpg, tn_(3).jpg, tn_(6).jpg, tn_(7).jpg, tn_(8).jpg, tn_(9).jpg, tn_(10).jpg, tn_(12).jpg, tn_(13).jpg, tn_(16).jpg, tn_(18).jpg, tn_(20).jpg, and tn_(23).jpg
- v) 38 Photographs, filenames DSC_1177.jpg through DSC_1214.jpg
- w) 43 Photographs, filenames DSC_0001.jpg through DSC_0043.jpg
- x) 583 Color Photographs, filenames D6216-001 to D6216-583 taken by Design Research Engineering, dated April 10, 2017, marked BPRO000905 to BPRO001196
- y) C.K. Clarke and D. Halimunanda, *Imperfections in Tree Stand Failures*, ASM International

Deposition of Mr. Snyder (Plaintiff):

- Mr. Snyder testified that he had prior work experience working on power line construction. (20). During this employment Mr. Snyder came to understand that “anybody goes up at height, they can fall and become seriously injured or killed.” (22).
- Mr. Snyder had previously owned an API brand, Shooting Star model climbing treestand. (31). This Shooting Star treestand was stolen at some point. The only other treestand owned by Mr. Snyder was the API brand treestand involved in this matter. (33).
- Mr. Snyder testified as follows on page 37:
 - Q. Well, they were designed to go up in trees at a -- at a elevation above the ground level, right?
 - A. Yes, sir.
 - Q. And you knew based upon your background and based upon the instructions that you saw in the Shooting Star that any time you go up in a treestand, there's a danger of potentially falling, right?
 - A. Correct.
 - Q. As a result of, uh, this inherent danger that's in treestands, you knew as a consumer that it was really important to read and follow all of the instructions given by the manufacturer, right?
 - A. Uh, yes.
 - Q. In fact, that's -- you knew as a consumer that that was the way in which a manufacturer was telling you what the intended use of the stand was, right?
 - A. Correct.
- Mr. Snyder testified as follows on pages 38 and 39:
 - Q. You knew that whenever using these climbing treestands or any climbing treestand that the only thing that was really holding you at height was the treestand itself, right?
 - A. Yes, sir.

- Mr. Snyder testified as follows on page 40:
 - Q. And you knew that inspecting the stand to see if it was damaged in any way was important, right?
 - A. Correct.
- Mr. Snyder testified as follows on page 41:
 - Q. And you know you hadn't used them before. So, you knew the best place to look for the proper maintenance would have been in the instruction manual, right?
 - A. Correct.
 - Q. And if the instruction manual told you to maintain the product in a certain way, you knew because of the inherent dangers in the products that you had to follow those or there was a danger you could be seriously injured or killed, right?
 - A. To a degree.
- Mr. Snyder testified as follows on page 42:
 - Q. So, you knew that whatever -- for whatever reason there was a problem with that stand because it hadn't been properly maintained, that could cause an incident, right?
 - A. In regard to maintenance, I can never recall reading anything it said maintenance of -- of the stand. You keep the parts together. It shows you more -- the instructions I used I can't recall anything in regard to stand maintenance.
- Mr. Snyder testified as follows on page 44:
 - Q. You knew to make sure that you were using the product in a -- in a proper and safe manner that you should read the instructions, especially considering the inherent dangers that are in these products.
 - A. I read -- read the instructions. As far as keeping them, I was moving around a lot, I read them and again, I would like to reiterate the fact that I only used the stand for a brief period of time.
- Mr. Snyder testified as follows on page 47:
 - Q. You knew as a consumer, did you not, that it was important for you to look at the instructions and follow those with regard to any specific maintenance it stated, right?
 - A. There was no maintenance that I've ever specified that I was ever aware of.
- Mr. Snyder testified as follows on page 53:
 - Q. Were there any other representations made by API related to the stand that -- that induced you to buy the stand?
 - A. No. ...
 - Q. Were there any representations made by any person at Bass Pro that induced you to buy this stand?
 - A. No.
 - Q. Okay. It was a closed box item; is that right?
 - A. Correct.
- Mr. Snyder testified as follows on page 57:
 - Q. Do you recall buying treestands at any other store other than Bass Pro?
 - A. No, sir.
 - Q. Is it possible you may have purchased this at a different store?
 - A. No, not a chance at all.
- Mr. Snyder testified as follows on page 58:
 - Q. Can you be more specific than saying sometime between 2007 and 2009 you purchased the product?
 - A. No, I couldn't.
- Mr. Snyder testified as follows on pages 59 and 61:
 - Q. Do you have a memory of opening the box?
 - A. I opened it. Nothing specific.
 - Q. Okay. Did it come with instructions?

A. I believe so, yes.

Q. Okay. And did you read the instructions?

A. Correct.

Q. And did you have any confusion with the instructions?

A. Not that I recall.

Q. Did it come with a video?

A. Pretty sure that one did.

Q. And did you watch the video?

A. I'm pretty sure I watched that one.

Q. And did you have any problems with that video or confusion with that video?

A. No, sir.

Q. At any point in time did you feel the need to call API with any confusion or questions that you had related to any instructions on either the video or the written instructions?

A. No.

Q. Did it come with a harness?

A. Yes.

Q. And part of the instructions that it came with did discuss the use of harnesses, did it not?

A. Yes.

Q. And part of the video discussed the need and importance of using a harness, true?

A. Yes.

Q. Did it come with a stabilizer strap?

A. A stabilizer strap?

Q. It's a strap used after you get at height to, uh, tie around the tree where the seat portion of the stand is used so that it doesn't shift.

A. I can't recall.

Q. Okay. Did it come with a tether that tethered the two parts of the stand together?

A. Um, I can't recall it having the tether strap.

Q. Okay. Did it come with backpack straps?

A. Uh, yes.

Q. Did it come with straps that were used to go over your feet for climbing purposes?

A. Uh, yes, bungee straps (indicating).

Q. Okay. Did it come with webbing straps and bungee straps?

A. No, it was just -- they were bungee type, (indicating) if I remember correctly.

◦ Mr. Snyder testified as follows on pages 61 through 63:

Q. Did you understand after reading the instructions and watching the video that it was intended to be used at all times with a full body harness?

A. Yes, sir. ...

Q. And did you understand and comprehend that the instructions stated that, uh, that a harness should be attached to the tree from the time you left the ground until the time you returned?

A. Yes, sir.

Q. You understood that this harness was being provided by the manufacturer to be used in case of any fall events, right?

A. Correct. ...

Q. You understood that its purpose was to prevent you from hitting the ground in a fall event, right?

A. To prevent from hitting the ground, correct.

◦ Mr. Snyder testified as follows on page 64:

Q. Was there a reason that you didn't wear harnesses?

A. Yes, sir.

Q. And what is that?

- A. Fear of suspension death.
- Mr. Snyder testified "...we hunted on National Forest away from a large distance from people, I felt my chances of survival of stand failure of me hitting the ground would be greater than that of the stand breaking and me getting knocked out unconscious, and nobody would know where I'm at and hanging on a tree on the side of the tree and dying as I had read several different cases." (66, 67).
- Mr. Snyder testified as follows on page 73:
 - Q. Would you agree with me that you made the intentional decision based upon your own research to decide to not follow the expressed instructions of the manufacturer because you thought it was safer?
 - A. Correct. I did.
- Mr. Snyder testified as follows on page 88:
 - Q. Were -- did you read any -- regardless of whether it's stand failure, did you read any discussions or periodicals that related to the need to wear harnesses?
 - A. I knew that in certain situations if the stand was still up in the tree that I'm sure it would greatly improve your chances of survival if the stand is still in the tree.
- Mr. Snyder testified as follows on page 92:
 - Q. In your event, you were injured by hitting the ground, right, in a fall event?
 - A. Yes, sir.
 - Q. And would you agree with me that if you were wearing the harness that was provided with the treestand by the manufacturer and properly having that worn and attached to the tree, you would not have hit the ground at the time of your fall?
 - A. I agree I would not have hit the ground if -- if it would have -- of course, I'm sure it would have supported my body weight. I agree I would not have hit the ground.
- Mr. Snyder testified as follows on page 108:
 - Q. Did you ever replace any of the chains on these stands?
 - A. Uh, no, not that I replaced the chain.
 - Q. Did you ever have any problems putting the clips through the chains at any point in time?
 - A. No.
- Mr. Snyder testified as follows on page 114:
 - Q. Was there ever any plastic inserts that went in there?
 - A. Um, none that I ever recall.
 - Q. Okay. So, there may have been. You just don't recall it?
 - A. None that I've ever been aware of.
- Mr. Snyder testified as follows on page 114:
 - Q. Okay. The other question I have is in your fall event, this portion (indicating) of the platform up in the treestand remained in the tree after you fell, right?
 - A. Yes, sir.
- Mr. Snyder testified as follows on pages 118 and 119:
 - Q. And that's fair enough. You can't say one way or the other as to whether there were ever plastic inserts that went in here, right?
 - A. Well, it seemed like we never had used it, you know, 'cause the bottom had the plastic and you had the plastic and you slid it. It had its V's of the plastic sliding, sliding up into -- up into the stand.
 - Q. So, you think there may have been plastic inserts at that point?
 - A. I'm pretty sure. I mean I -- if they were in the bottom, they were in the top, you know, I would imagine. I mean I really can't remember how it come. It's just a long time since I looked at it and ...
 - Q. Okay. And I'm just trying to say one way or the other, do you have any actual memory of whether or not they were in either the top or the bottom?

A. No.

- Regarding the specific model name for the treestand involved in the subject incident, Mr. Snyder testified “...maybe it was just the Grand Slam Extreme, but I can't say with certainty.” (131).

- Mr. Snyder testified as follows on page 132:

Q. You don't have enough memory of the original instructions to say one way or the other whether these were the ones that came with it; is that fair?

A. Correct.

- Mr. Snyder testified as follows on pages 133 through 135:

Q. So, if you saw the, uh, the damage we see in Exhibit 7, would that have been something that would have caused you not to use the stand (indicating)?

A. Correct.

Q. Okay. And you would have -- at that point in time that's the point of -- of your inspection is to find damage such as we see in Exhibit 7, right?

A. Yeah, I mean I -- yes. ...

Q. Was that also the type of damage [Exhibit 8] that you would look for when you were inspecting the stand?

A. I would have looked for it, yes.

Q. And was that also the type of damage that would have caused you to take the stand out of use because of a potential unsafe condition?

A. More than likely.

Q. And that's because, uh, I think you said something about leverage. You could see that something was grinding on the -- on the chain; is that right (indicating)?

A. Well, I mean there's -- there's friction there.

Q. And you knew that friction, if you had seen it, was a bad thing and could compromise the stand, true?

A. It's a possibility.

Q. And you would have taken it out of use and not used the stand if you saw that (indicating), right?

A. Yes, at that time. Yes, of course.

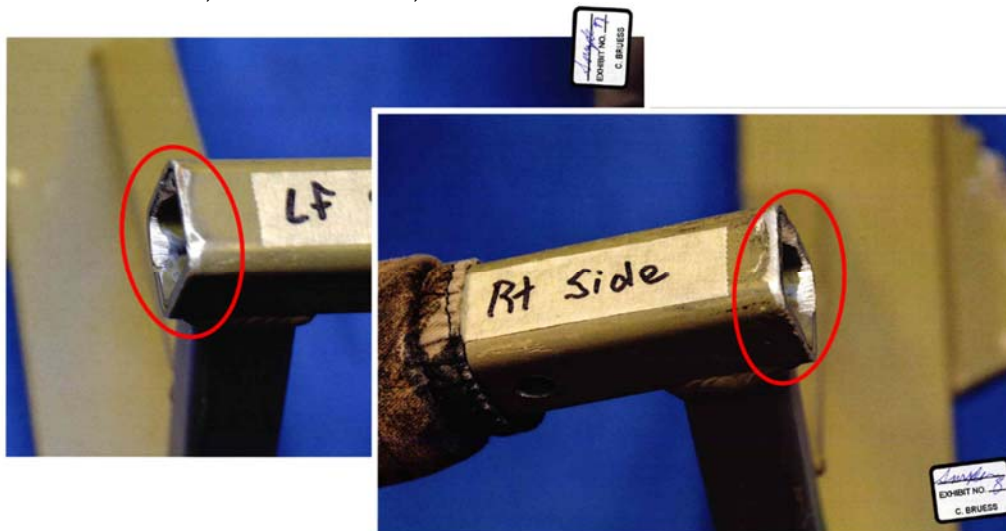


Figure 1 - Exhibits 7 and 8

- Mr. Snyder testified as follows on page 136:

Q. Now, if I recall, you were ultimately able to call for -- for help on your cell phone; is that right?

A. Yes, sir.

Q. So, it was at an area in which you got cell reception?

- A. Amazingly, yes, sir, we got -- got cell phone signal.
- Mr. Snyder testified as follows on page 153:
 - Q. Did you use any -- any strap or any other method of securing the top portion of the -- of the stand to the tree?
 - A. No. I wasn't aware there was a way I could strap.
- At the moment of his incident Mr. Snyder had been in his treestand for approximately one hour. (158).
- Mr. Snyder indicted at the start of his incident sequence heard the chain pop ("sounded like a .22 going off"). Because of the manner in which he sat in his treestand, Mr. Snyder further described a motion similar to a forward roll off of the foot platform directly away from the tree after separation of the treestand from the tree. (160). Mr. Snyder fell to the ground with the treestand seat platform around his body, possibly around his waist.
- At the time of this incident, he was 5 feet 11 inches tall and weighed between 194 and 202 pounds. (173).

Deposition of Mr. Hogan (Bass Pro Shops Outdoor World LLC):

- Mr. Hogan was employed by Bass Pro Shops Outdoor World LLC as a merchandiser at the time of his deposition. (3). A position held by Mr. Hogan since approximately mid-2006. (7).
- Mr. Hogan testified that Mr. Paul Meeks was involved with the API brand of treestands under at least two entities. (4).
- Bass Pro shops was not able to confirm that specific treestand involved in the matter was sold through Bass Pro Shops, either model or specific product. (6).
- It was specifically noted that the API brand treestands were manufactured by Outland Sports at one point in time.
- In 2008 to 2009 a company called Mainstream Holdings started manufacturing API treestands. (8). [Mainstream Holdings owns a company called Global Manufacturing which actually distributes the products.]

Defense Interrogatories and Document Production:

- The API treestand manufactured by Outland Sports, Inc. was not sold by Bass Pro Shops from its Katy, Texas store in 2008 or 2009. (First Set of Interrogatories, Ans. 4(f), 4(h)).
- "The subject product was manufactured by Outland Sports, Inc., a company that ceased business on or about 2003" (Request for Admissions, 3).
- "Defendant admits that it has sold certain API brand climbing treestands in the past, but that the stand at issue was manufactured by Outland Sports, Inc., which sold products to a variety of retailers. Stating further, Defendant has no record of distributing or selling the subject treestand." (Request for Admissions, 5).

Written Product Instructions for the Treestand and Full Body Harness System:

- The fourth page of the instructions included the following:

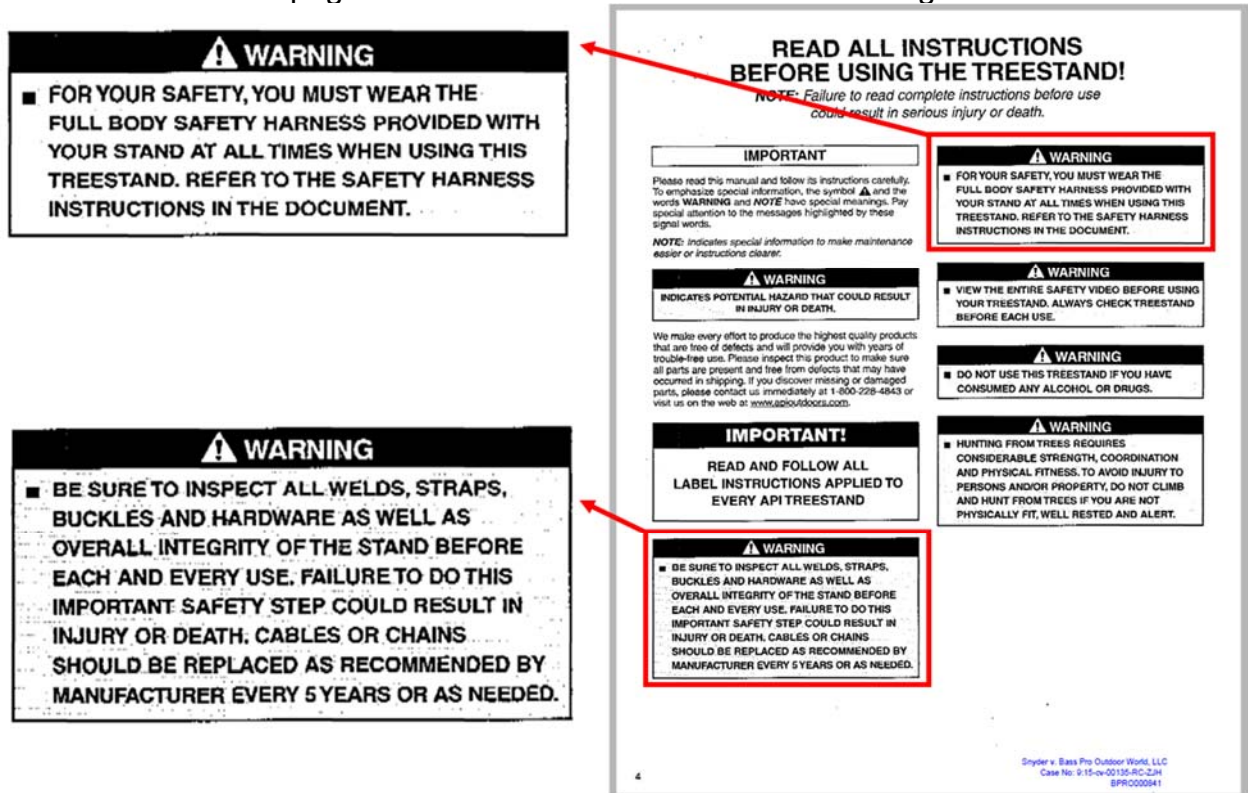


Figure 2 - Warnings

- The climbing instructions illustrate the user being connected to the tree with a full body harness fall arrest system prior to stepping on the to the treestand at ground level, Step A and Figure G. (page 8).
- Step E and Figure L of the climbing instructions instructs the user to secure the seat frame of the treestand to the tree to the tree with the provided stabilizer strap via the holes in the yoke, illustrated in Figure 3.



Figure 3 – Photograph 33 - Cropped and annotated

- The 'climbing down' section of the instructions instructs the user not to "REMOVE THE SAFETY HARNESS TETHER FROM THE TREE UNTIL YOU HAVE REACHED GROUND LEVEL." (page 9).
- Under the heading Care & Maintenance the user was instructed to replace the chain every five years at a maximum, as illustrated in Figure 4. (page 11).

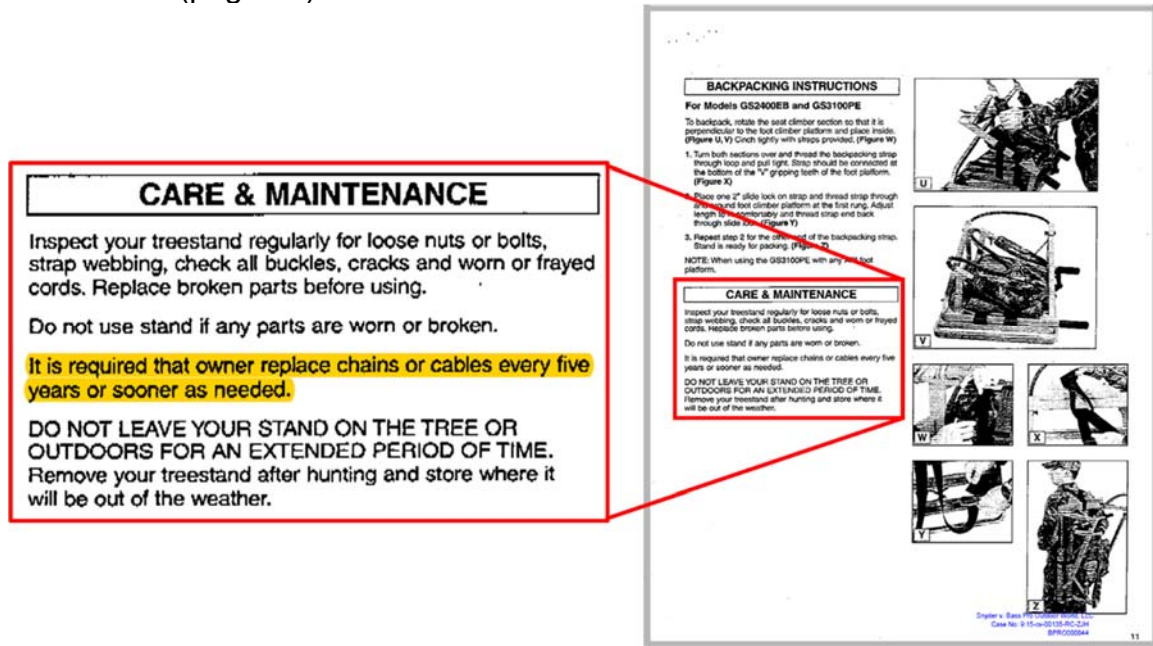
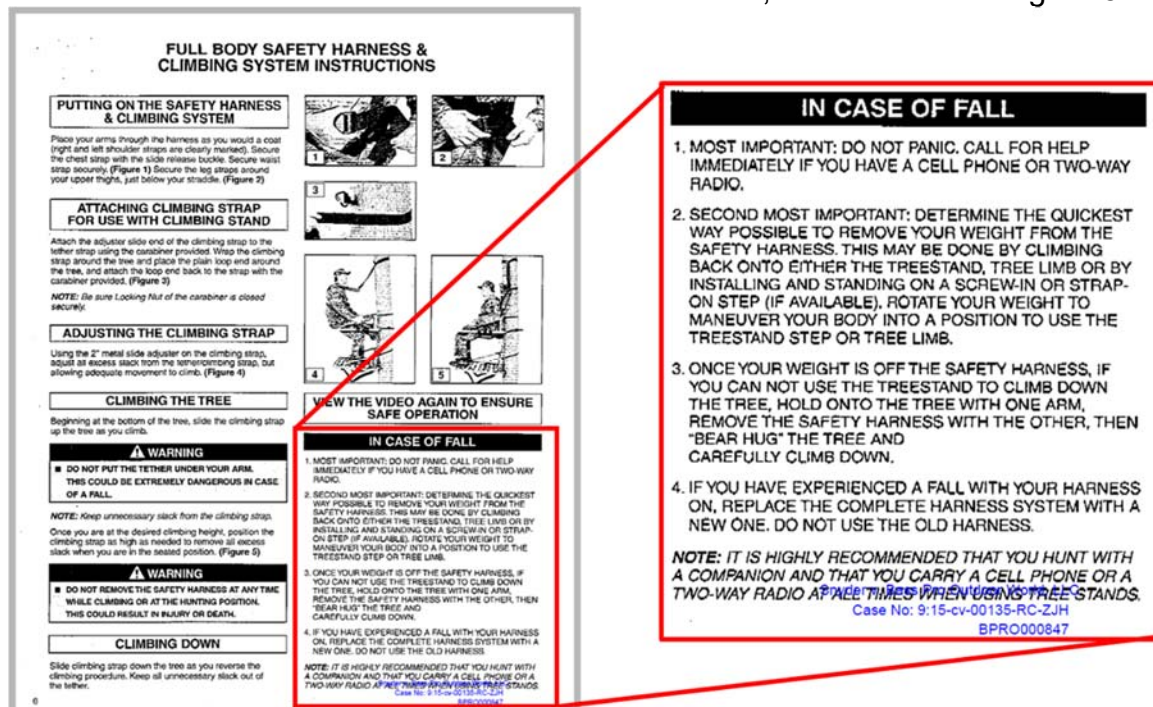


Figure 4 - Page 11 - Care & Maintenance

- The instructions provided with the fall arrest system included specific instructions for the user in the event of a fall, as illustrated in Figure 5.



- The assembly instructions addressed the use of a strap to secure the user's feet/boots to the foot platform and the use of a heel bungee cord to help maintain control of the foot platform, on page 7 steps 5 and 6.
- The assembly instructions required the user the connect the foot and seat platform with the supplied attachment rope, page 7 step 7.

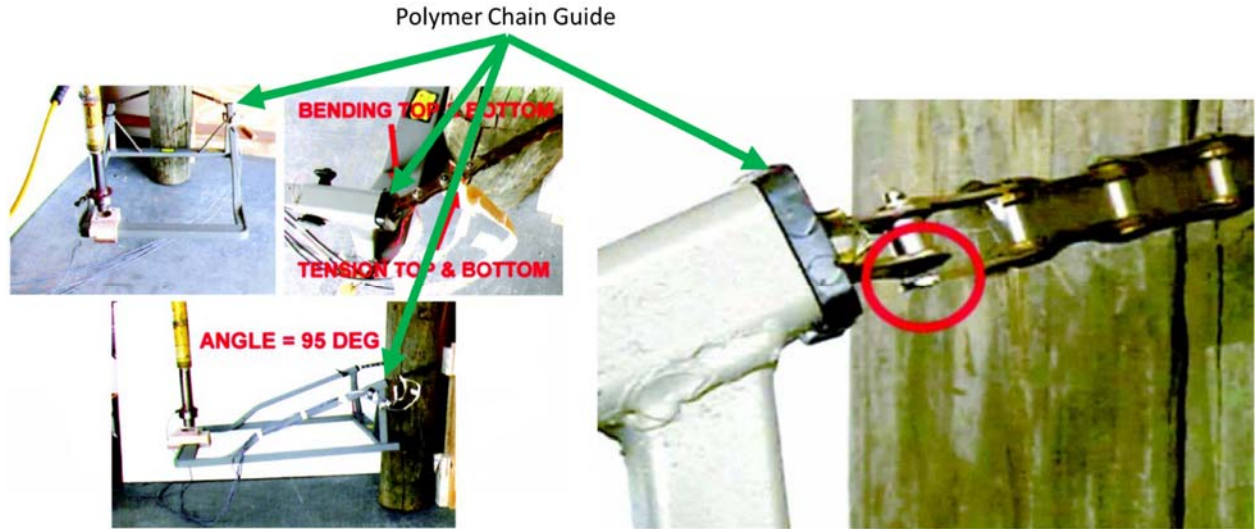
Expert Report of Dr. Clarke:

- "The tree stand had no identifying labels as to who made the tree stand." (2).
- "There was no evidence of misuse or abuse present on the tree stand." (2).
- "Inspection of the chain where the separation occurred revealed that a pin connecting two side plates had pulled out or allowed the two side plates to become disconnected." (2).
- All references to a chain utilizing a chain with four stake marks in Dr. Clarke's report reference a chain manufactured by the current manufacturer of the API brand treestand and are not directly related to the products manufactured by Outland Sports under the API brand.
- "Figures 11 and 12 show the respective drag out marks in the plates. All of the observed evidence is consistent with the chain separating as Mr. Snyder sat in the stand. Slight/normal movement provided the necessary forces to move the pin out of the holes." (3). This statement only references the ultimate separation of the chain not the initiation or root cause of the separation.
- "The chain separated because the critical pin was not properly staked so that it would stay in place. ... This is a clear manufacturing defect." (3-4).
- "These roller chains were never meant to be used in anything but a straight line pull. The design of the API stand puts the chain in bending when it exits the tube on each side. This places a prying action by the plate onto the pin." (4)
- "No evidence of abuse, neglect, or overloading was observed on the stand or chain. Plastic tube connectors were missing but these played no role and did not contribute to the separation of the chain." (4).
- "This API chain was unreasonably dangerous for its intended use because of the bad quality of manufacturing by API." (4)

Clarke and Halimunanda, *Imperfections in Tree Stand Failures*:

- The paper was published the ASM International Journal of Failure Analysis and Prevention in February 2006.
- One of the authors of this paper is the Plaintiff's expert witness, Dr. Clarke.
- The illustrations, specifically Figures 12 and 13, from this article clearly illustrate that the treestand used for this evaluation was an API seat

frame which was configured similarly to Mr. Snyder's incident treestand. Notably Dr. Clarke's exemplar treestand was properly equipped with the polymer chain guides where the chain exited the seat frame, as illustrated in Figure 5. These were the plastic tube connector referenced in Dr. Clarke in his expert report in this matter.



Upper images of Figure 12

Figure 5 - Polymer Chain Guide

- "Stress analysis and tests demonstrated that roller chain with cracked links could operate at rated capacity without further crack growth and showed that *loads approximately three times rated capacity were required to cause the pullout of an improperly staked pin.*" (24).
- "Failures occurring at loads in excess of design or rated capacity will usually initiate at imperfections, but such imperfections should not be termed defects because they do not reduce the performance of the system below design capacity." (24).
- "These chains do become loose with use. However, inspection of chains used on tree stands never revealed significant opening of the hole diameters that could allow the pins to work out." (29).
- "Tests were run to determine the effect of a pin with no upset or staking on one end. One pin end was ground flush to duplicate lack of staking. Using this pin on a tree stand produced no pullout. A test was then run with the pin driven out of the two bottom links [the condition illustrated in the right image of Figure 5] at 4000N [899 pounds] load. Figure 13 shows the pin clear of the link and stable at 4000N [899 pounds]." (29). It should be noted that this load was applied out the outboard end of the seat platform (furthest from the tree), as illustrated in Figure 5 in the left most images, which would result in significantly higher stress in the chain than that for a user sitting next to the tree as Mr. Snyder testified.

- “The pin could have worked loose during prior use before the accident, but these tests demonstrate that a chain in the condition found could still support loads adequate to deform the stand, 4000N [899 lbs].” (29)
- “Tests and calculations revealed that even with an improperly staked pin, the pullout could not be explained under normal hunting conditions.” (30).
- “Imperfections in both cases (assuming that the chain cracks occurred in manufacturing) were very obvious and totally unacceptable for manufacturing quality for the chain. However, neither imperfection was capable of producing failure under design use conditions. Instead, conditions outside of normal use were the probable cause of both chain failures, even though the failures occurred at imperfections.” (30).
- “Failure of the improperly staked chain with additional service is also difficult to address without conducting fatigue tests on the stand. However, it can be said that because failure most likely occurred at force levels over four times the hunter’s weight, it is unlikely that a later failure under normal conditions would occur unless the pin dropped completely out of the chain.” (30).

Photographs disclosed by plaintiff:

- Figure 6 appear to be the earliest photograph of the treestand seat platform post-incident.
- This photograph and the remainder disclosed in folder P004238 show that the treestand had been modified from its post-incident condition. Referenced facing the tree, the left retaining pin has been removed and the longer length of chain is simply resting in the platform unrestrained. The right pin is in place but the short length of chain had been removed from the treestand prior to documentation.



Figure 6 - Crop of photograph “20131129_152732.jpg”

Inspection

On May 12, 2015, Beacon Scientific conducted a visual/non-destructive inspection of a portion of the physical evidence retained in this matter. This evidence included the foot and seat platform assemblies of an API brand climbing treestand (manufactured by Outland Sports, Inc., model Grand Slam Extreme based on configuration, model year unknown). This was the treestand reportedly involved in Mr. Snyder's incident. The evidence inspection took place in the conference room of The Ammons Law Firm, LLP located at 3700 Montrose Boulevard in Houston, Texas.

On January 24, 2017, Beacon Scientific, conducted an additional visual/non-destructive inspection of the balance of the physical evidence, also at The Ammons Law Firm conference room. This evidence included the Savage 7mm-08 rifle bearing serial number H203563 being utilized by Mr. Snyder on the day of his incident, an exemplar API brand Magnum climbing treestand (manufactured by Global Manufacturing Company, LLC, model number GCL505-A, 2014 model year), a used API brand treestand (Grand Slam Bowhunter model GS2400, marked 'Olson'), API Climber Replacement Chain set including instructions and replacement chain guides (model GHS6603, manufactured by Global Manufacturing Company, LLC., ordered from Mack's Prairie Wings on February 4, 2015). Following the second non-destructive evidence inspection, Beacon Scientific conducted a site inspection at the location where the incident occurred. The incident tree was located with latitude and longitude coordinates and verified by review of photographs reportedly taken at the incident scene or shortly after the incident. The tree was located near N 31° 6.502' W 95° 2.787' ± 13 feet (6 miles northeast of the town of Groveton, Texas in the Davy Crockett National Forest). The scene inspection included climbing the incident tree and documenting condition/dimension of the tree. These inspections were documented with notes, measurements, and 680 high resolutions digital color photographs.

The exemplar used API brand treestand (Grand Slam Bowhunter model GS2400, marked 'Olson') appeared to be consistent with a product illustrated in the 1999 catalog marked BPR000851 (as well as several others) based on the camouflage pattern on the seat, the color of the chain sheath material, the overall configuration, and the means of attachment of the foot platform foot straps. The on-product label only makes reference to API Outdoors, an indication that the product was manufactured prior to the involvement of Outland Sports, Inc (Photograph 521). It was significant to note that four polymer chain guides were present on this treestand (although the right guide on the foot platform needed to be replaced). The typical configuration is illustrated in Figure 7, not the reduced clearance between the chain the guide.

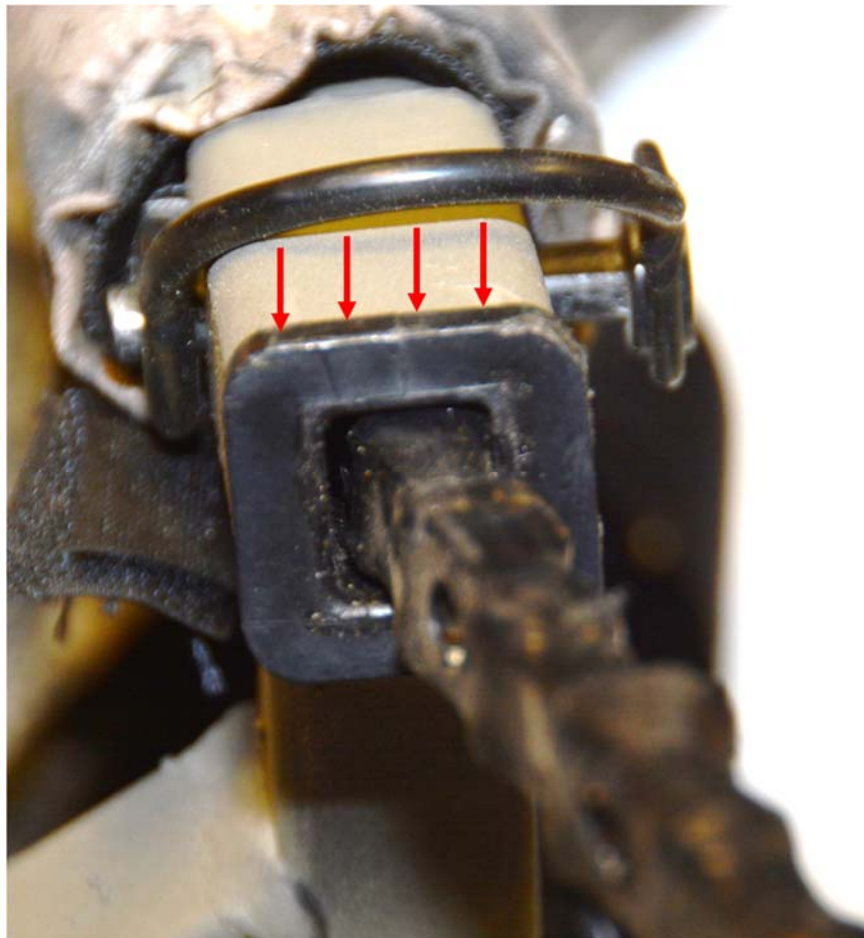


Figure 7 - Polymer Chain Guide - (Crop of Photograph 516)

On-product labeling, illustrated in Photographs 155 through 170, indicate that the incident treestand was manufactured under the API Brand by Outland Sports, Inc. in Tallulah, Louisiana. Based on an inspection of the product and a review of the catalogs produced in the matter, the treestand involved in Mr. Snyder incident appears to be a Grand Slam Extreme model from the 2003 model year (BPRO000896). This determination was made based on the overall configuration of the product, the camouflage pattern utilized for the seat and padding covers, the number of connection points for the sling seat, and the information regarding the timeframe for Outland Sports to have been the manufacturer of API brand treestands. Also from the 2003 catalogs the Grand Slam Extreme treestands came equipped with polymer chain guides, based on BPRP 000904 illustrated in Figure 8.

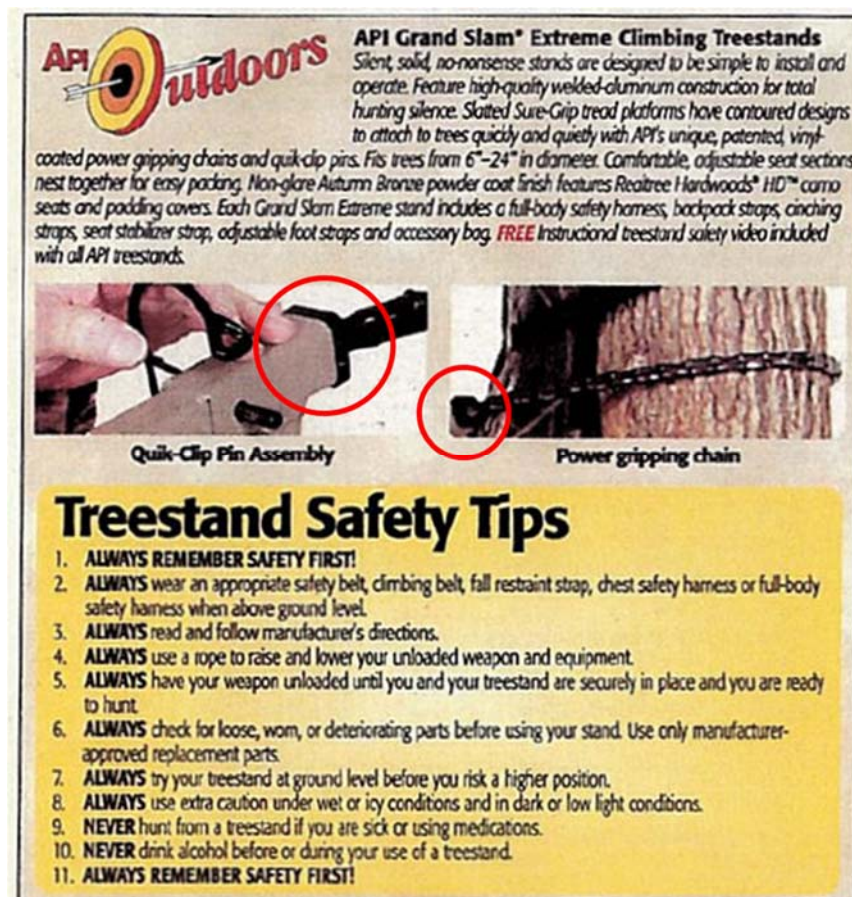


Figure 8 - Crop from BPRO 000904 (2003 Hunting Catalog)

It was observed that the chains from Mr. Snyder's treestand had increased tolerance associated with the chain assembly when compared with a new chain assembly, as discussed further below.



Figure 9 - Photograph 37

A unique wear pattern was observed at the location where the chain exited the treestand platforms, as illustrated in Figure 10. The wear pattern was due to metal to metal contact between the structural tubing of the treestand and the link plates on the chain, as discussed further below.

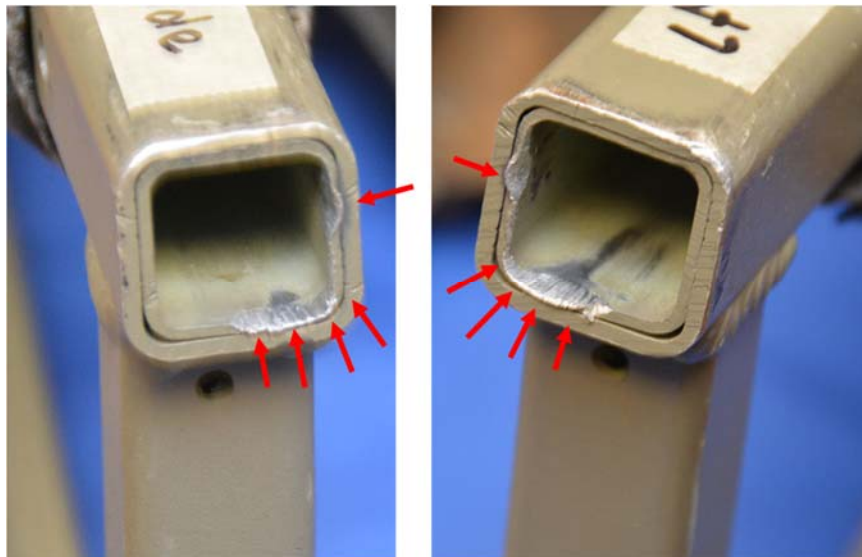


Figure 10 - Composite Image - Photographs 151 and 154

The link plates of the chain are only exposed after the polymer jacketing material wore completely through, as illustrated in Figures 11 and 12.

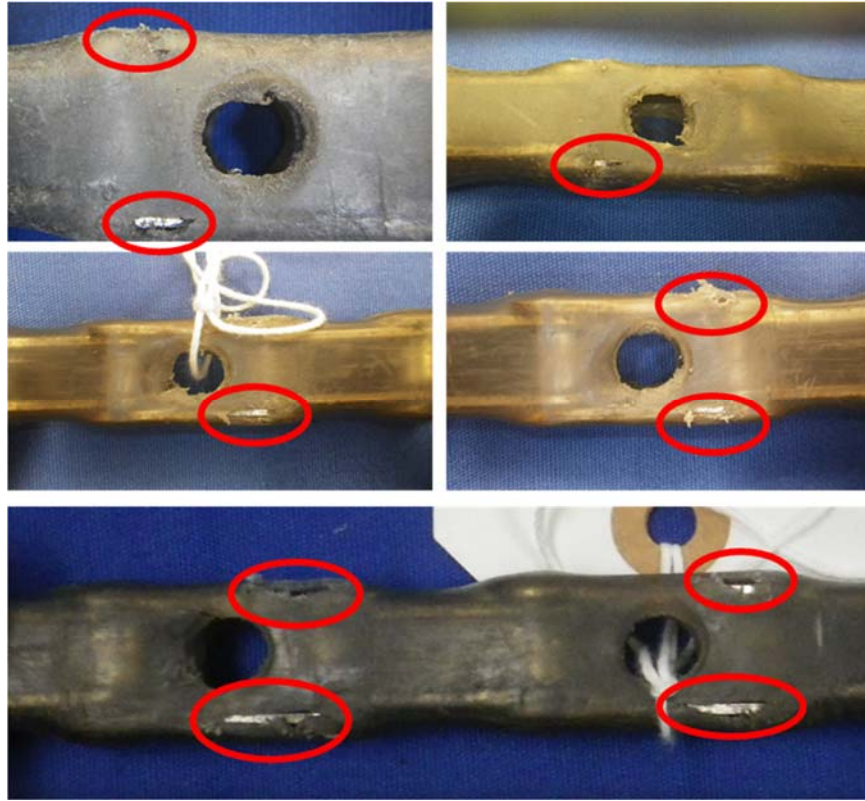


Figure 11 - Composite Image from Photograph 353, 356, 432, 435, and 466

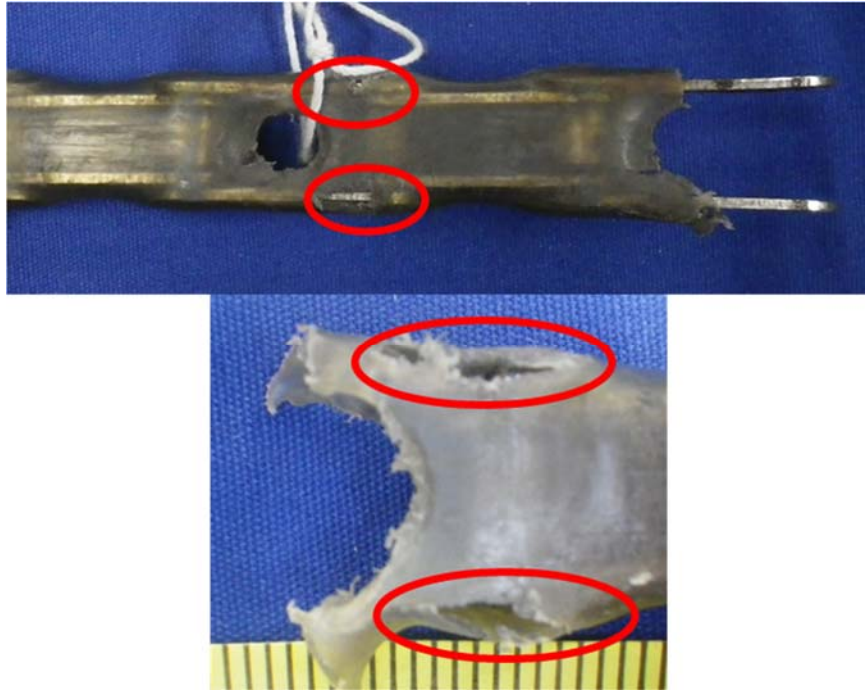


Figure 12 - Tree side at the separation - Photographs 471 and 473

Discussion

As previously stated, the on-product labeling, illustrated in Photographs 155 through 170, indicated that the incident treestand was manufactured under the API Brand by Outland Sports, Inc. in Tallulah, Louisiana. *Based on an inspection of the product and a review of the catalogs produced in the matter, the treestand involved in Mr. Snyder incident appears to be a Grand Slam Extreme model from the 2003 model year (BPRO000896).* This determination was made based on the overall configuration of the product, the camouflage pattern utilized for the seat and padding covers, the number of connection points for the sling seat, and the information regarding the timeframe for Outland Sports to have been the manufacturer of API brand treestands. *Mr. Snyder's incident occurred in November 2013, making the treestand 10 years old at the time of the accident.*

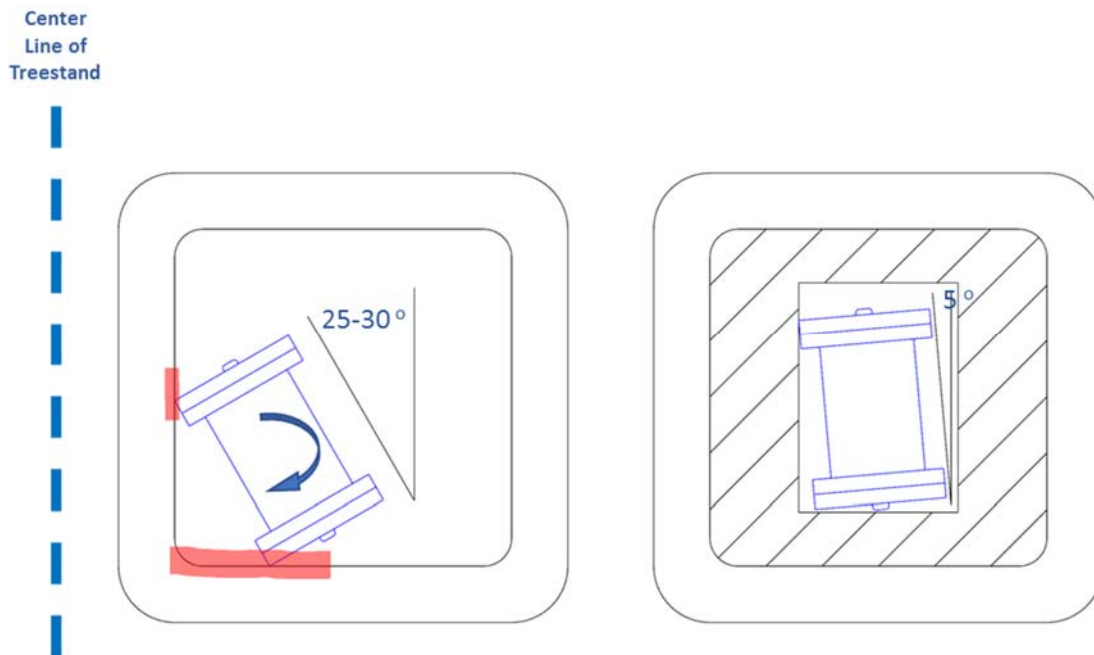


Figure 13 - Sketch of Chain Exit (approximately to scale)

Various exemplar products manufactured before and after the incident product have been examined during the investigation in the matter. All of these products have included a polymer chain guide installed at the four locations where the chains exit the structural frame of either the foot platform or seat platform. The 2003 catalogs illustrate that the Grand Slam Extreme treestands also came equipped with polymer chain guides, based on BPRO 000904 as illustrated in Figure 8. This chain guide minimized wear on the jacket around the chain assemblies by providing a low friction surface for the chain to bear against during the use of the product. It had the added benefit of locating the chain within the structural tubing and providing as shown in Figures 7 and 12. The significance of the polymer chain guide is that it would eliminate the possibility of metal to metal contact between the steel chain links and aluminum structural tubing by protecting the jacketing of the chain assembly. As discussed previously and shown in Figure 10, the incident treestand did not have polymer chain guides where the failed chain exited the structural support. *Mr. Snyder failed to maintain his treestand in the condition in which it was designed and sold by not maintaining and continuing to use the polymer chain guides which directly contributed to Mr. Snyder's incident.*

It was observed that the jacketing material on the chain had worn through at several locations such that the steel link plates of the chain were no longer concealed/protected, as illustrated in Figure 11. This wear-through was also seen at the separation location. The wear-through locations were adjacent to the retaining pin holes and were consistently on one side of the chain assembly (the inside or tree side as installed). The consistency of the wear-through on the jacketing is an indication that it was Mr. Snyder's practice to leave the chain in the treestand when not in use and to only disconnect a single pin to connect the treestand to the tree for each use. The positioning of the chain in the structural tubing would only change relative to the size tree being used and by the increment of the pin hole spacing in the chain assembly. Because Mr. Snyder did not maintain the polymer chain guide (a low friction bearing surface) the chain jacket was pinched directly between the steel link plates and the corner of the structural tubing (a high friction and potentially abrasive bearing surface). *The wear-through of the chain assembly jacketing was the direct result of Mr. Snyder failing to maintain his treestand in the condition in which it was designed and sold by not maintaining and continuing to use the polymer chain guides which directly contributed to Mr. Snyder's incident.*

During normal use of the product the chain would support differential tension on the top and bottom link plates based on the mechanics of the chain engaging the tree on an inclined plane (higher tension on the upper links because they would be in direct contact with the tree and lower tension on the lower links). Depending on user technique some degree of localized bending would be expected where the chain exists the platforms due to the drag of the chain on the tree, downward during ascent and upward during descent (generally). This was confirmed by Dr. Clarke in an article he had written in the past and referenced in his expert report in this matter. Because of the differential tension the chain would want to twist along its length, a motion which would be limited by the relatively close tolerance between the chain and polymer guide. In comparison, the chain in the structural tubing would not be tightly controlled. Figure 12 illustrates these

two scenarios (the hatched area on the right image of Figure 12 represents the polymer chain guide).

Outland Sports, Inc. recognized that the chain assemblies were potential wear items and specifically required replacement of the chain assemblies every 5 years. Over the course of time, roller chain can become ‘loose’ with use. This type of loosening is similar to when the chain on a child’s bike become loose and the rear wheel needs to be positioned further rearward to keep the chain from skipping off the sprocket. In his prior article, Dr. Clarke stated that “These chains do become loose with use. However, inspection of chains used on tree stands never revealed significant opening of the hole diameters that could allow the pins to work out.” (Journal of Failure Analysis and Prevention, 29). Treestand manufacturers as well as other manufacturers routinely have parts that must be replaced over time due to wear. Beacon Scientific is familiar with various treestand and related products that require the replacement of cables, chains, straps and harnesses within a specified time frame. During his use of the product Mr. Snyder left the incident chain in service for 10 years, twice the recommended useful life. When a wear component is left in service beyond the recommended replacement period the product cannot be expected to perform as designed. Mr. Snyder’s practice of not replacing the chain on his treestand was misuse of the treestand and directly contributed to Mr. Snyder’s incident.

Although the comparison is limited because the new chain was made from an entirely different manufacturer, tolerance measurements were taken of a new chain assembly. These chains showed that over a length of 18 inches the tolerance within the chain would allow 4 to 5 degrees of rotation. When 18 inches of Mr. Snyder’s chain was evaluated it allowed approximately 25 to 30 degrees of rotation or 6 times that observed in the new chain assembly. This is an indication of the increased flexibility caused by Mr. Snyder’s extended misuse of the chain assembly for well beyond the recommended service life. An increase in flexibility of the chain due to normal wear and tear would be expected, as stated by Dr. Clarke in his prior article. The increase in flexibility observed in Mr. Snyder’s chain was the direct result of long term misuse/abuse by Mr. Snyder.

The wear-through of the chain jacketing combined with not maintaining the polymer chain guide eventually allowed direct metal to metal contact between the chain link plates and the inner walls of the aluminum structural tubing. *Metal to metal contact between the steel link plates and the inner walls of the aluminum tubing under load was the direct cause of the wear pattern illustrated in Figures 1 and 10.* When the chain assembly is not loaded during normal use it would sag to the condition illustrated in Figure 9. When viewed in cross-section on the right side of the treestand looking away from the tree, this condition would be approximated by the left image of Figure 12. When the chain was loaded from the rest condition, illustrated in the left image of Figure 12, point contacts would develop between the steel link plates and the inner walls of the aluminum tubing, resulting in material removal from the inner wall of the aluminum tubing (i.e. wear/gouging/galling). When the chain assembly is loaded it rotated toward the orientation illustrated in the right image of Figure 12 (looking away from the tree a counter-clockwise movement on the left and the clockwise movement on the right). The rotational motion of the chain combined with the mechanical resistance from the link to wall interaction would tend to pry the lower link plates from the chain assembly and compress the upper link plates into the chain assembly. *The sequence of events that developed over the course of years and lead to the separation of the chain at the time of Mr. Snyder's incident initiated with not using the polymer chain guides (an observable condition), progressed to the wear-through of the chain jacketing (an observable condition), continued with the ever increasing removal of material from the aluminum tubing (an observable wear pattern), to separation of one set of link plates (a stable condition per Dr. Clarke's prior article and an observable condition), and finally leading to ultimate separation on the day of Mr. Snyder's incident. The separation of the chain assembly at the time of Mr. Snyder's incident was not a one-time sudden event but the culmination long term misuse/abuse of the product, a series of unforeseeable consequences of a user not complying with written warnings and instructions, and a user ignoring obvious physical changes in the product over a period of years.* Mr. Snyder himself admitted that the damage at the end of the aluminum tubing was indicative of a condition that would have

caused him to remove it had he noticed the condition. Based upon wear marks on the tubes, this condition existed for a long period of time prior to the day of the incident. Thus, based Mr. Snyder's own testimony, the stand should have been removed from use.

The API brand climbing treestand was sold as a complete climbing system including four major components; the seat platform, the foot platform, a full body harness restraint system, and written and video warnings and instructions. The climbing system required the user to wear a full body harness that was properly adjusted and attached to the tree at all times when elevated above ground level including climbing up, hunting at height, and descending from height. Mr. Snyder testified that he read and understood the written, and video warnings and instructions regarding use of the harness system with the treestand. By his own admission, at the time of his incident Mr. Snyder did not use or intend to use the full body harness restraint system. Mr. Snyder made a conscious decision to deviate from the warnings and instructions and misuse the stand in a way he knew and understood was contrary to the intended use by the manufacturer. He did so based on his assessment that he "felt my [his] chances of survival of stand failure of me hitting the ground would be greater than that of the stand breaking and me getting knocked out unconscious." (66-67). Literature routinely illustrates the possibility of serious injury or death from a fall event from height. For these reasons, all hunter safety programs, all literature, the National Bow Hunter Education Foundation and the International Bow Hunter Education Foundation universally warn the user of a treestand to always wear a full body safety harness and to remain attached to the tree from the moment the user leaves the ground until their feet are firmly placed back on the ground. Mr. Snyder in effect made a choice to guarantee injury if a fall event occurred falling from height versus the ability to recover to the foot platform of his treestand and the ability to call for help or self-recover. Consistent with his sister's testimony, Mr. Snyder would not have fallen to the ground had he been properly connected to the tree with a full body harness at the time of his injury. Mr. Snyder understood that there was a risk of falling at any time, for whatever reason, while climbing, hunting at an elevated

height, and descending from height. Mr. Snyder understood that falling without a properly adjusted and connected fall restraint system could lead to serious injury or death. Mr. Snyder understood that the fall restraint system would have prevented him from falling to the ground had the system been connected and adjusted consistent with the instructions provided with the product. *Mr. Snyder used a climbing treestand system without a properly adjusted and connected fall restraint system with a full understanding of the risks involved and the consequence of that risk, serious injury or death. Had Mr. Snyder been using the properly adjusted and connected fall restraint system supplied with the climbing treestand, consistent with the written, and video warnings and instructions, Mr. Snyder would not have fallen to the ground and sustained the injuries which he sustained in this incident. Mr. Snyder did not comply with the written, and video warnings and instructions provided with the product which was a substantial factor in the extent and magnitude of the injuries which he sustained.*

Mr. Snyder modified the product, ignored obvious changes in the function of the product, and failed to replace the chain assembly after five years as instructed. Further, Mr. Snyder ignored the requirement to utilize the supplied full body harness restraint system. *It is not foreseeable or intended by a manufacturer/distributor/retailer that a user will blatantly and knowingly disregard published warnings and instructions that result in injuries that would have otherwise been avoided if the user had heeded the warnings and instructions provided. Had Mr. Snyder complied with the written, and video warnings and instructions his injuries would have been avoided.*

Evaluation of Expert Opinions

Dr. Clarke was not critical of the design but concludes that the staking of the pin was improper and constituted a manufacturing defect. Dr. Clarke's opinions are contrary to his early published study, and are not born out by the physical evidence. The physical evidence demonstrates that the product operated properly through extended use through years, even though it had been modified.

The physical evidence (as discussed above) demonstrates that the incident occurred as a result of improper maintenance and use, and was not related to design or manufacture.

Dr. Pustilnik concluded that the lay literature supported a fear of suspension trauma in the use of a full body harness. In investigating treestand incidents for over a decade, I am unaware of a single instance of suspension trauma while properly using a full body harness designed in a treestand setting. The ability of a person to recover in such a setting makes this a unique situation that is not considered in the literature. The threat of being seriously injured or killed in a fall from height is repeatedly discussed in literature in the hunting field, in occupational settings, and in many other settings.

Conclusions/Opinions

Based on but not limited to Beacon Scientific's investigation, Beacon Scientific has concluded to a reasonable degree of scientific and engineering certainty that:

1. Based on an inspection of the product and a review of the catalogs produced in the matter, the treestand involved in Mr. Snyder incident appears to be a Grand Slam Extreme model from the 2003 model year.
2. This design was safe for its intended use and was certified by an independent testing company to meet or exceed all industry standards.
3. There is no evidence of manufacturing defect in this product, and the product was appropriately manufactured.
4. Mr. Snyder's incident occurred in November 2013, making the treestand 10 years old at the time of the accident.
5. Mr. Snyder failed to maintain his treestand in the condition in which it was designed and sold by not maintaining and continuing to use the polymer chain guides which directly contributed to Mr. Snyder's incident.
6. The wear-through of the chain assembly jacketing was the direct result of Mr. Snyder failing to maintain his treestand in the condition in which it was designed and sold by not maintaining and continuing to use the polymer chain guides which directly contributed to Mr. Snyder's incident.
7. Mr. Snyder admitted in his deposition that he was required to inspect the product prior to use and that the damage seen at the end of the

assembly was the type of damage that would have caused him to remove it from use. The instructions warn the user to remove from use if any such damage is found. The damage predated the incident. Snyder caused his own accident by failing to remove the treestand from use.

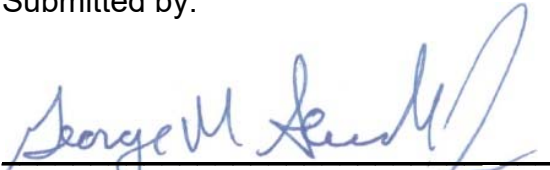
8. Outland Sports, Inc. recognized that the chain assemblies were potential wear items and specifically required replacement of the chain assemblies every 5 years. The stand was over ten years old at the time of the accident and Snyder failed to replace the chain.
9. When a wear component is left in service beyond the recommended replacement period the product cannot be expected to perform as designed. Wear components are routinely used in treestands and other products, and replacement of chains within five years is an acceptable method of care and maintenance on a treestand product.
10. Mr. Snyder's practice of not replacing the chain on his treestand was misuse of the treestand and directly contributed to Mr. Snyder's incident.
11. The accident resulted directly from misuse. Metal to metal contact between the steel link plates and the inner walls of the aluminum tubing under load was the direct cause of the wear pattern illustrated in Figures 1 and 10.
12. The sequence of events that developed over the course of years and lead to the separation of the chain at the time of Mr. Snyder's incident initiated with not using the polymer chain guides (an observable condition), progressed to the wear-through of the chain jacketing (an observable condition), continued with the ever increasing removal of material from the aluminum tubing (an observable wear pattern), to separation of one set of link plates (a stable condition per Dr. Clarke's prior article and an observable condition), and finally leading to ultimate separation on the day of Mr. Snyder's incident.
13. The separation of the chain assembly at the time of Mr. Snyder's incident was not a one-time sudden event but the culmination long term misuse/abuse of the product, a series of unforeseeable consequences of a user not complying with written warnings and instructions, and a user ignoring obvious physical changes in the product over a period of years.
14. Mr. Snyder used a climbing treestand system without a properly adjusted and connected fall restraint system with a full understanding of the risks involved and the consequence of that risk, serious injury or death.
15. Had Mr. Snyder been using the properly adjusted and connected fall restraint system supplied with the climbing treestand, consistent with the written, and video warnings and instructions, Mr. Snyder would not have

fallen to the ground and sustained the injuries which he sustained in this incident.

16. Mr. Snyder did not comply with the written, and video warnings and instructions provided with the product which was a substantial factor in the extent and magnitude of the injuries which he sustained.
17. It is not foreseeable or intended by a manufacturer/distributor/retailer that a user will blatantly and knowingly disregard published warnings and instructions that result in injuries that would have otherwise been avoided if the user had heeded the warnings and instructions provided.
18. Had Mr. Snyder complied with the written, and video warnings and instructions his injuries would have been avoided.

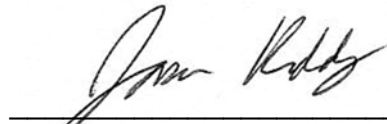
Beacon Scientific reserves the right to supplement this report if new/additional information becomes available.

Submitted by:



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Mechanical Engineer

Reviewed by:



Jason S. Kiddy, Ph.D.
Mechanical Engineer